

**REMARKS**

Claims 1 and 2 are pending in the application. Claim 1 has been amended. Favorable reconsideration of the application is respectfully requested.

***I. REJECTION OF CLAIMS 1 AND 2 UNDER 35 U.S.C. §103(a)***

Claims 1 and 2 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Kitamura et al. (U.S. Publication No. 2004/0009218) in view of Weissmuller et al. (U.S. Patent No. 6,677,142) and further in view of Dobetti (U.S. Patent No. 6,596,311). The Examiner states that while Kitamura and Weissmuller do not teach the use of glucan containing polysaccharides as disintegrants, polysaccharides such as amylose are known disintegrants in the tableting art, as evidenced by Dobetti.

Applicants respectfully traverse the rejection for at least the following reasons. Claim 1 has been amended to recite an  $\alpha$ -1,4-glucan having a degree of polymerization of not less than 186 and less than 668. Support for the amendment can be found in the specification at least on page 33, lines 18-20.

As acknowledged by the Examiner, neither Kitamura nor Weissmuller teaches or suggests the use of  $\alpha$ -1, 4-glucan as a disintegrant. Accordingly, these references and the disclosures therein are not relevant to the problem and results attained by the claimed invention in using  $\alpha$ -1, 4-glucan as a disintegrant.

With regard to the Examiner's reliance on Dobetti for teaching the use of polysaccharides (i.e. amylose) as a disintegrant, it is noted that Dobetti does not explicitly teach the use of  $\alpha$ -1,4-glucan having a degree of polymerization between 186 and 668. At column 4, lines 46-67 Dobetti discloses a list of disintegrants from which to choose, the list including 6 different classes of agents, one of which includes starches and amylose. Bearing the aforesaid in mind, the working examples of Dobetti demonstrate the use of maize starch (natural starch), starch 1500 (natural starch), Avicel (microcrystalline cellulose), AC-DI-SOL (modified cellulose), and crospovidone (cross-linked polyvinylpyrrolidones) as such disintegrants. Moreover, from examples 5-7

coropovidone and maize starch were shown to result in fast disintegrant times. Thus Dobetti teaches away from the use of alternate disintegrants for fast disintegration times.

It must be recognized that not only does Dobetti disclose a myriad of disintegrants from which to select, but teaches towards the use of natural starches (maize) or cross-linked polyvinylpyrrolidones as such disintegrants.

As described in the present specification, the use of amyloses derived from natural starches is to be avoided, this contrasting to Dobetti's explicit teaching of the use of maize starch. Specifically, in the background of the present specification it is disclosed that problems exist with amyloses obtained from natural starch. Amyloses contained in natural starch generally have a wide dispersity ( $M_w/M_n$ ) of not less than 1.3. Such amyloses are a mixture of (i) low molecular weight amyloses with a high crystallinity index which are difficult to swell, (ii) high molecular weight amyloses of high bonding strength and (iii) amyloses of middle molecular weight between them which swell easily. Consequently, those amyloses of various molecular weights inhibit each other and counteract the excellent features of the other amyloses of different molecular weights.

The present inventors discovered that by using a chemically synthesized  $\alpha$ -1, 4-glucan as the disintegrant, a disintegration time of 20-21 seconds is attained irrespective of pH, as demonstrated by sample 3 of the working examples in the subject application.

In view of the foregoing, faced with the problem of the present invention, which is the development of a disintegrant for use in a tablet for improved disintegration of the active ingredient therein, those skilled in the art would not have utilized the disclosure of Kitamura and Weismuller as a starting point and basis. Moreover, in view of Dobetti there is no disclosure indicating to the skilled artisan to specifically select  $\alpha$ -1, 4-glucan with a degree of polymerization between 186 and 668. Nor would one skilled in the art have any reasonable expectation that such a glucan could result in the demonstrated

disintegrant times. In contrast, Dobetti teaches towards the use of disintegrants other than the claimed glucan in order to achieve fast disintegrant times.

Because one skilled in the art would have had no reasonable expectation of success, based on the combined teachings of Kitamura, Weismuller and Dobetti that an  $\alpha$ -1,4-glucan having a degree of polymerization of not less than 186 and less than 668 and a dispersity of not more than 1.25 would be a disintegrator in a tablet, prima facie obviousness has not been established. Accordingly, the rejection under 35 U.S.C. §103(a) should be withdrawn.

## **II. OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTION**

Claims 1 and 2 have been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 7,759,316 (Kitamura et al.) in view of Weismuller et al. and Dobetti.

Applicants respectfully traverse the rejection. The claims of Kitamura are directed to a biodegradable article formed from enzyme-synthesized amylose using phosphorylase. The claims of the present application recite a disintegrant for tablets. As previously noted, a disintegrant has a unique function, defined as "*a substance used in tablet formulations to cause the tablet to break up on contact with moisture and exert its medical action promptly.*" The process of disintegration is well recognized as a physical phenomenon requiring the disintegration agent to be contacted with water and swollen thereafter resulting in the molded tablet to be physically disintegrated.

In contrast, Kitamura et al. merely discloses the use of amylose in order to exert the effects of excellent biodegradability of a pharmaceutical. The term "biodegradability" is defined as "*the susceptibility of a substance to decompose by microorganisms, specifically the rate at which detergents and pesticides and other compounds may be chemically broken down by bacteria and/or natural environmental factors.*" Thus, the process of biodegradation is well recognized as a biological phenomenon requiring microorganisms or environmental factors to degrade the agent and has nothing whatsoever to do with disintegration. The claims of the present

application cannot be considered an obvious variant of claims 1-12 of Kitamura. Accordingly, the obvious-type double patenting rejection should be withdrawn.

### **III. CONCLUSION**

Accordingly, claims 1 and 2 are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

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